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UVC Lights Enhance IAQ for ASPCA

NEW YORK — The American Society for the Prevention of Cruelty to Animals (ASPCA) was already using ultraviolet (UV) light technology to disinfect bottled water in holding tanks, so Vincent Grujic, ASPCA director of facilities, was familiar with the germicidal properties of UVC energy. He was not aware, however, of the availability of a new generation of UVC devices that are specially designed for use in air-handling systems.

"We needed to keep the air as clean as possible to protect the health of staff, volunteers, and of course, the animals," said Grujic. "In addition, we wanted a way to get more life and efficiency from our air handlers." Grujic reported that an HVAC upgrade program that included UV lights is helping to achieve these goals at the ASPCA headquarters in New York City.

PREVENTING INFECTIONS

In 2004, Scott Sherwood, president of Eco-Care Corp., a company specializing in pollution control and energy conservation, suggested that the devices could provide the ASPCA with multiple benefits of IAQ and infection control; HVAC maintenance savings; and energy efficiency.

When properly installed in an air-handling system, UVC Emitters™, manufactured by Steril-Aire Inc., Burbank, Calif., emit enough germicidal energy to penetrate submicron microbes, destroying its DNA and RNA, or killing or deactivating it, the manufacturer explained. In this manner, UVC stops both surface organisms that grow inside HVAC systems and airborne microbes that circulate through these systems to the occupied space.

The product has been shown to work against viruses, bacteria, mold and mold spores. Because the five-story ASPCA building includes extensive animal housing and the Bergh Memorial Animal Hospital, a full-service small-animal medical facility, any technology that helps prevent the spread of infection is of importance.

"Eco-Care had already equipped the ASPCA air handlers with 95 percent ASHRAE efficiency [MERV 14] bag filters for air quality enhancement, and [EER] units for energy conservation," said Sherwood. "We believed, however, that UVC lights could add another dimension of IAQ control and energy performance."

The facility was about to embark on a major renovation anyway, so the ASPCA agreed to have Eco-Care install UVC lights, on a phased basis, in three air-handling units (AHUs) serving the building. The AHUs are two 15-year-old existing units, one 90-ton and one 40-ton unit, and a new, 50-ton system serving the renovated floor. The AHUs typically run 24/7 with air exchanges every four hours, and 100 percent outdoor air intake for disease control.

Eco-Care, a company specializing in pollution control and energy conservation, installed UVC lights, on a phased basis, in three air-handling units serving the ASPCA building in New York City.

Grujic said there is a direct relationship between good IAQ and infection control, both in the ASPCA hospital area and in the animals' living quarters.

"Though we have not done a formal study, we can tell that the enhanced indoor air quality is helping to reduce both the number of upper respiratory infections in the animals and their severity," he said.

"We believe the UVC lights and the high-efficiency filters are making a difference because they do such a good job of removing infectious disease organisms from the air."

In addition, the remodeled facility will provide canine and feline boarders with expanded housing that Grujic and others describe as "condos" because of their spaciousness and premium construction, which incorporates radiant heating, Corian® walls, windows, and other amenities.

ENERGY SAVINGS

After Eco-Care installed lights in the existing AHUs, Grujic said he quickly noticed a big improvement in system efficiency. "During the summer of 2005, one of our hottest summers on record, we were actually getting complaints that the building was too cold.

"After looking into the reasons, we found that the temperature

The header above shows obvious signs of dirt and fouling before the installation of UVC lights in the air handler. On the left is the same header after the installation and operation of UVC lights in the ASPCA's air handlers.

at the coil of our 90-ton AHU was as low as 47˚, about a 10˚ drop from our usual readings," he said. "We had to turn up the set point to compensate. Even though this unit was ready to be replaced, with the help of UVC we made it through the worst summer heat in decades."

Grujic continued, "Our coils used to be clogged up, and heat transfer was compromised as a result. UVC keeps the coils so clean that it basically rejuvenates our systems and allows them to run as efficiently as when they were new."

With energy costs now at about 22 cents per kW, Grujic said he expects that the energy savings over time will be significant.

WORKER PROTECTION

There is another benefit to having the a/c coils continuously cleaned by UVC: the reduction or elimination of coil cleaning as a scheduled maintenance task. "Workers are no longer exposed to cleaning chemicals, and we also eliminated the problem of chemical residue recirculating back through the building as air blows through the coil after a cleaning," said Grujic.

UVC also helped solve the problem of contamination in drain pan areas, he noted. "We used to have a lot of rust and organic material going down the drain, and now the problem has virtually disappeared." Worker exposure to chemicals in these areas has again been eliminated.

"I don't like to send our crews into the AHUs too often because bacteria and mold can naturally collect there. UVC lights reduce this problem dramatically," Grujic said.

The lights themselves require an annual changeout. The doors to the AHUs are equipped with a double-switch backup system, so no one can enter the unit with the lights on, thus preventing direct exposure to the UVC rays.

The ASPCA recently installed a new replacement AHU as part of its extensive renovation. The unit initially ran without UVC lights. After four weeks, a number of building professionals inspected the system. They found that the downstream side of the coil drain pan had become slimy and full of bacterial growth (microfilm). Culture plates confirmed the existence of multiple microorganisms. The AHU has since been equipped with UVC lights, and the facility's administrators expect the coil to operate at peak heat transfer capability over time.

NO-KILL GOAL

The ASPCA is dedicated to making New York a no-kill city, meaning that healthy, adoptable animals will be adopted out instead of euthanized. In addition, pet spaying and neutering are strongly encouraged to lower shelter intake of puppies and kittens. The improved air quality in the ASPCA facility and its renovations will help protect the health of the animals, staff, volunteers, and patrons. ■

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